

# FOURTH BORE

PROJECT UPDATE FALL 2013

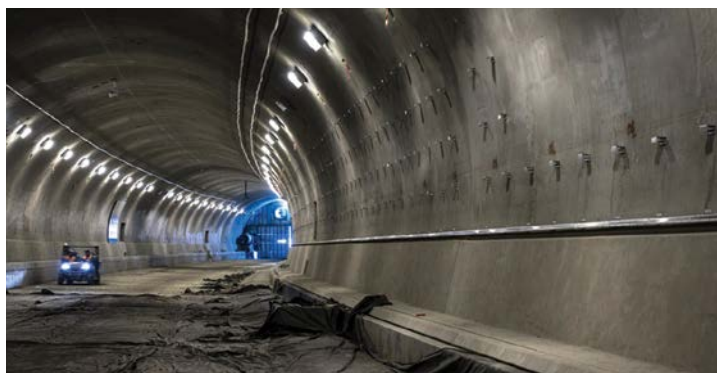
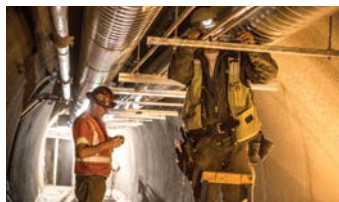


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## PROJECT INTRODUCTION

The Caldecott Fourth Bore Project represents a partnership between the Federal Highway Administration, the California Department of Transportation, the Metropolitan Transportation Commission, the Contra Costa Transportation Authority, and the Alameda County Transportation Commission to build a two-lane fourth bore north of the existing three Caldecott tunnels. When it opens to traffic in November 2013, it will provide congestion relief along a heavily traveled portion of State Route 24 between Alameda and Contra Costa counties.



Workers install the roadbed before concrete pavement installation.

## TUNNEL SYSTEMS BRING FOURTH BORE TO LIFE

The Caldecott Tunnel Fourth Bore may look close to completion, but some of the most complicated work has just begun. Over the coming months, construction crews will install, integrate, and test the extensive systems that will run the tunnel's fire safety, traffic, and communications functions. These systems are vital to ensuring the safety and efficiency of the tunnel when it opens to traffic in November 2013.

## FIRE PREVENTION AND RESPONSE

Most of the systems being installed in the Fourth Bore are referred to as Fire-Life-Safety Systems, which is the infrastructure needed to detect and suppress a fire and protect the travelling public. There will be linear heat, carbon monoxide and nitrous oxide detectors to monitor fire and air quality. Video Image Detectors (VID) will notify operators in case of an incident inside the tunnel. The tunnel will also be equipped with 19 bi-directional jet fans and 17 Emergency Stations (Please see diagram on page 3.)

Both the Oakland and Moraga-Orinda Fire Departments will respond to tunnel fires. To shut down the tunnel, stop lights outside the tunnel entrances will be turned on. Crosspassages along the tunnel will allow access between Bores 3 and 4 for evacuation (both bores will be shut down if there is an incident in either one). These crosspassages will have closed-circuit televisions and intercoms so operators can monitor and communicate with anyone inside. The passages will also have a ventilation system that will create positive pressure inside, preventing smoke and flames from entering. Seventeen

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## FOR MORE INFORMATION

Community outreach to neighbors, community, and civic groups in Alameda and Contra Costa counties is important. For more information please visit:

WEBSITE: [www.Caldecott-Tunnel.org](http://www.Caldecott-Tunnel.org)

E-MAIL: [Ivy\\_Morrison@dot.ca.gov](mailto:Ivy_Morrison@dot.ca.gov)

*Photos clockwise from top left: Workers install ventilation and other systems in a cross-passage; the tunnel's facade design echoes the Art Deco style of the 1937 Caldecott tunnels; the lighting system will use high-pressure sodium lights that will brighten and dim throughout the day to match the lighting outside the tunnel; also shown: brackets for aluminum panel installation. All photographs by Karl Nielsen, Metropolitan Transportation Commission.*

PROJECT OVERVIEW

The Caldecott Fourth Bore Project is composed of four separate contracts. In addition to the construction of the Fourth Bore itself, there are two smaller projects to enhance traffic flow in the vicinity of the tunnels, which have been completed.

- In addition, the project includes the following elements:
- Construction of retaining walls and portals at the new tunnel openings
  - Temporary and permanent soundwalls on the west side
  - Seven emergency cross passages between the third and fourth bores
  - Demolition of the existing maintenance building and construction of a new two-story operations and maintenance building
  - Installation of operations, communications and emergency systems
  - Various roadway improvements
  - A project to re-landscape both sides of the tunnel will be implemented after the tunnel opens to traffic and will be completed by late 2014

CONGESTION RELIEF

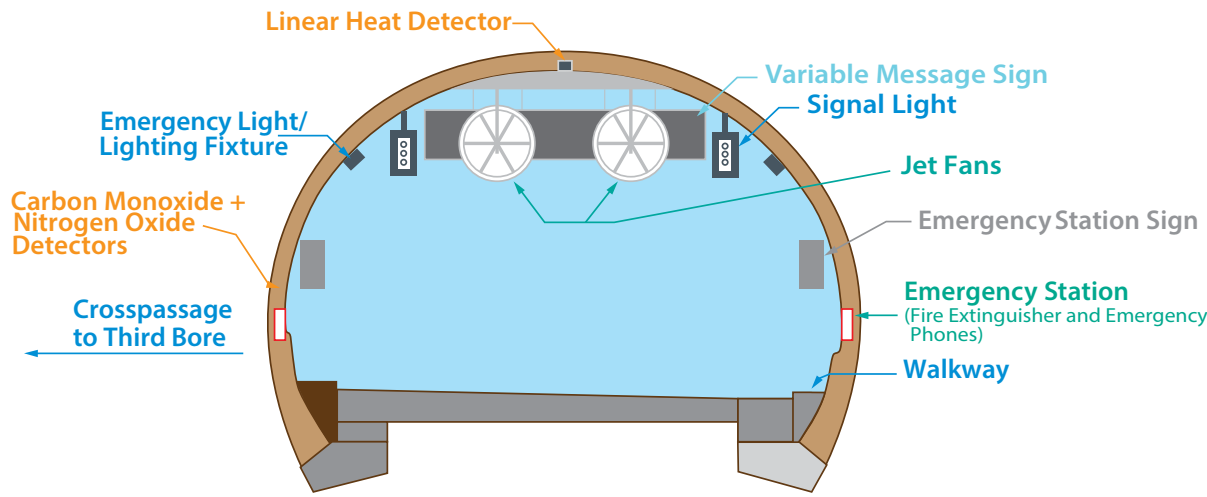
State Route 24 currently carries about 160,000 vehicles a day through the three existing tunnels. Traffic congestion is experienced in the peak and off-peak directions.

The new Fourth Bore will relieve congestion in the off-peak direction by permanently dedicating two bores to westbound traffic and two to eastbound traffic. This will eliminate the need to reverse traffic direction in the center bore twice a day to accommodate morning and evening commute traffic, and add greater predictability on weekends.



Rendering of the eastern portal of the Fourth Bore, currently under construction to the north of Bore #3.

TUNNEL SYSTEMS CROSS SECTION



Incident Detection and Response



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Emergency Stations in niches throughout the tunnel will house fire extinguishers, manual fire alarms, and emergency phones. In the event of a fire, jet fans will be activated along with the ventilation system, and can redirect air flow. Even the tunnel lining was built with special fibers that shield the tunnel from heat and prevent a strong fire from damaging the tunnel structurally.

TRAFFIC EMERGENCY RESPONSE

The Caldecott Fourth Bore is designated as a regional lifeline structure, and is designed to reopen to emergency traffic within 72 hours of a major earthquake. Tunnel systems will help with traffic management. The VID cameras will monitor traffic patterns and alert an operator if there is a slow-down or accident. Variable Message Signs at the portal and within the tunnel will display pre-programmed messages triggered when there is an event. A tunnel radio system will be able to override other radio stations to give

emergency messages to motorists.

OPERATING THE TUNNEL SYSTEMS

A state-of-the-art Operations and Maintenance Control (OMC) building is under construction. The new facility will be the “nerve center” for the four Caldecott tunnels, as well as the Webster-Posey Tubes in Alameda County. The OMC will be staffed 24 hours a day, seven days a week by specially-trained operators, who must pass a rigorous test administered by the State Fire Marshal before the tunnel opens to traffic.

OTHER SYSTEMS

In addition to the systems mentioned above, the tunnel will also feature Strong Seismic Monitors to detect seismic activity. The information gathered will be sent to the California Geological Survey to process and help predict future earthquakes.

FACTS

Groundbreaking: January 2010
Bore Opens to Traffic: November 2013
Roadway Construction Completion: Winter 2014
Total Funding: \$417 million
Traffic Lanes: Two 12-foot traffic lanes with two shoulders – 10 feet on the northern wall and two feet on the southern wall

200 HORSEPOWER

The strength of one jet fan is equal to 200 horsepower.



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200 HORSEPOWER

A mid-range sedan has around 200 horsepower

PROJECT TIMELINE



## APRIL HORVATITS HAS THE FINAL SAY IN FIRE SAFETY



It is not every day that a tunnel is built in the State of California. In fact, Devil's Slide, which opened to traffic in late March of this year, was the first

highway tunnel to be constructed in the entire state since the third Caldecott tunnel opened to traffic in 1964.

April Horvatits, Deputy State Fire Marshal, carries the responsibility of ensuring fire safety in Bay Area tunnels. In fact, Horvatits inspected Doyle Drive's Southbound Battery Tunnel, the new tunnels at Devil's Slide, and is currently inspecting the Caldecott Tunnel's Fourth Bore.

In preparation for the opening of the Fourth Bore in November 2013, Horvatits is working with the California Highway Patrol, local law enforcement and fire departments and other safety and emergency-response agencies to confirm that the tunnel meets the National Fire Protection Association's standards for tunnels.

Horvatits has also been working with an interagency team to develop a Fourth Bore Emergency Response Plan (ERP), which includes protocols and procedures for coordination between response agencies during an emergency.

The development of the Plan entails intensive agency coordination, as well as extensive site inspections before the Plan can be finalized. "The Fourth Bore must maintain a 'tenable environment,'" said Horvatits. This means that motorists must be able to exit the tunnel safely in the event of an emergency – thereby permitting emergency responders unimpeded access to the tunnel.

Horvatits looks forward to her first drive through tunnel when it opens to traffic. That's a strong endorsement from the Bay Area's tunnel safety expert.

## FOURTH BORE DIGS UP HISTORY

Caltrans has partnered with the University of California Museum of Paleontology (UCMP) at Berkeley to catalogue and analyze the many fossils discovered by an on-site paleontologist during the two-year Fourth Bore excavation process. The fossils are currently under close examination in a specially-dedicated lab on campus run by Mark Goodwin, Assistant Director of UCMP for Collections and Research.

This is not the first time fossils recovered from the Caldecott Tunnel have been catalogued by the UCMP, though today's effort is much more systematic. Excavations of the first three bores, as well as the Victorian-era Broadway Tunnel, yielded fossils that were catalogued by UCMP.

About one thousand specimens have been recovered from the three Miocene Epoch rock formations that comprise the Oakland-Berkeley hills: the Orinda, Claremont and Sbrante formations. Paleontologists have found remains of creatures once common in North America, dating to approximately twelve million years ago. Rhinoceros bones, a toe of a camel, and portions of a jaw of an oreodont – an extinct mammal distantly related to today's sheep – have been identified.



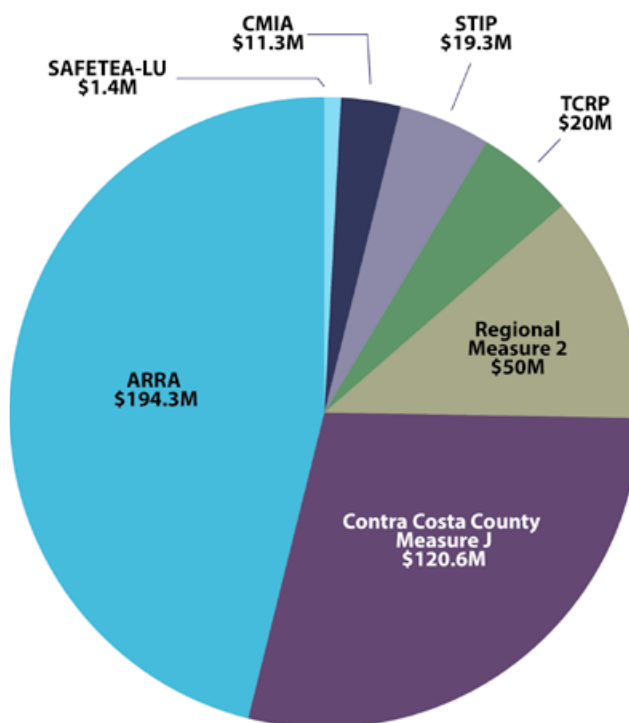
*A portion of the jaw of an extinct mammal known as an oreodont.*

According to Diane Erwin, plant paleontologist, many of the hundreds of fossilized leaves identified so far indicate an environment very different from today's. In the Orinda formation, she has found leaves that resemble those from laurel, willow and sycamore trees, which are types of plants commonly found by streams or rivers. Shell-bearing marine organisms – tiny but visible using a common stereo microscope – are also found in great quantities in the excavated dirt and rock from the Sbrante and Claremont formations.

Once fully identified and catalogued, likely by the end of 2013, the fossils will be part of UCMP's permanent collection, used in classrooms, displayed to the public, and available to researchers. Find photographs of fossils, and more information about how to access the collection, on our website, [Caldecott-Tunnel.org/Paleontology](http://Caldecott-Tunnel.org/Paleontology)

## FUNDING

The total programmed budget for the Caldecott Tunnel Fourth Bore is \$417 million.



For more information on these funding sources please visit [caldecott-tunnel.org](http://caldecott-tunnel.org)